CLAIMS:

1. A method for the detection and sorting of labelled or unlabelled microparticles from a mixture of microparticles on the basis of one or more of the following characteristics:

   (i) microparticle size;
   (ii) microparticle label;
   (iii) microparticle label intensity; and
   (iv) microparticle number.

2. The method according to claim 1 wherein the microparticles are labelled with a fluorescent label.

3. The method according to claim 2 wherein the microparticles are surface labelled.

4. The method according to claim 2 wherein the fluorescent label is internalized.

5. The method according to any one of claims 1 to 4 wherein said microparticles are detected and sorted using a flow cytometer.

6. The method according to any one of claims 1 to 5 wherein the microparticle is a silica microparticle.

7. A method for detecting aneuploidy in one or more chromosomes of a subject simultaneously, said method comprising:

   (i) producing fluorescently-labelled polynucleotide samples that are representative of the abundance of each chromosome in said patient;

(ii) further producing equivalent, non-aneuploid polynucleotide standards for each chromosome, labelled with a different fluorescent marker to the sample;

(iii) mixing said sample and standard with a limiting amount of binding agents for each chromosome, wherein said binding agents comprise a polynucleotide that is complementary to the sample and standard for each chromosome immobilized onto a microparticle, and the microparticles for each chromosome are distinct on the basis of size and/or fluorescent label and/or fluorescent label intensity;

wherein the fluorescent label on the microparticle, if present, has a distinct emission spectrum from both the label of the sample and standard; and wherein aneuploidy is detected as non-equal binding of said sample and said standard to said binding agent.

8. The method according to claim 7, wherein the patient is a diploid organism.

9. The method of claim 8, wherein the subject is a mammal.

10. The method according to any one of claims 7 to 9 wherein said mammal is a human.

11. The method according to any one of claims 7 to 9 wherein the animal is a livestock animal.

12. The method according to claim 11, wherein the livestock animal is selected from cattle, sheep and horses.

13. The method according to any one of claims 7 to 12, wherein the subject is an embryo.

14. The method of claim 13 wherein said embryo is generated using *in-vitro* fertilization.

15. The method according to claim 13 or 14, wherein said method is suitable for the detection of aneuploidy in said embryo prior to implantation.

16. The method according to claim 15, wherein the DNA sample is isolated, generated or amplified from a blastomere.

17. The method according to any one of claims 7 to 12 wherein the nucleic acid sample and standard are produced from genomic DNA from a somatic cell.

18. The method according to any one of claims 7 to 12 wherein the nucleic acid sample and/or standard are produced from genomic DNA from a reproductive cell or gamete.

19. The method of any one of claims 7 to 18 wherein said binding agent comprises a nucleic acid, with binding specificity for the sample and standard, immobilized on a microparticle.

20. The method according to claim 19 wherein the microparticle is a silica microparticle.

21. The method according to claim 20, wherein the silica microparticle is silanized.

22. The method of any one of claims 7 to 21 wherein the labelled sample and/or standard, and/or relative amounts of labelled sample to standard, are determined using a flow cytometer.

23. A kit for the simultaneous diagnosis of aneuploidy in one or more chromosomes in an organism, embryo or cell, comprising:

(i) fluorescently labelled oligonucleotide primer sets suitable for the amplification of chromosome specific polynucleotide sequences;

(ii) duplicate sets of oligonucleotide primers with identical sequence to the first sets, but comprising a different fluorescent marker with a distinct emission spectrum to the first marker;

(iii) a number of binding agents, distinct on the basis of microparticle size, reporter molecule, or reporter molecule intensity, equal to the number of chromosomes in the subject, wherein each binding agent comprises a polynucleotide sequence complementary to the predicted amplicon of the oligonucleotide primers which is immobilized to a labelled or unlabelled microparticle;

(iv) instructions for the use of said reagents;

wherein the label of the microparticle, if present has a distinct emission spectrum to the label of the both labelled oligonucleotide primers.